

What Is Claimed Is:

1. An isolated and purified DNA molecule encoding atrazine chlorohydrolase; the DNA molecule hybridizes to DNA complementary to DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na₂HPO₄, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.

2. The isolated and purified DNA molecule of claim 1 encoding the atrazine chlorohydrolase having an amino acid sequence shown in Figure 7 (SEQ ID NO:2).

3. The isolated and purified DNA molecule of claim 1 having the nucleotide sequence shown in Figure 6 (SEQ ID NO:1) beginning at position 236 and ending at position 1655.

4. The isolated and purified DNA molecule of claim 1 having the nucleotide sequence shown in Figure 6 (SEQ. ID NO:1).

5. An isolated and purified protein having a molecular weight of about 245 kilodaltons that converts atrazine to hydroxyatrazine.

6. The isolated and purified protein of claim 5 which is a homotetramer.

7. The isolated and purified protein of claim 5 which has the amino acid sequence shown in Figure 7 (SEQ. ID NO:2).

8. The isolated and purified protein of claim 7 bound to an immobilization support.

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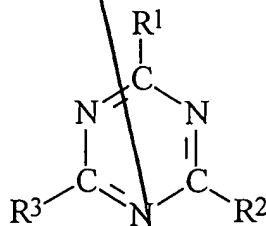
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9. An isolated and purified protein encoded by the DNA molecule of claim 1.
10. An isolated and purified protein encoded by the DNA molecule of claim 3.
11. A polyclonal antibody preparation produced from the isolated and purified protein of claim 5.
12. A polyclonal antibody preparation produced from the isolated and purified protein of claim 7.
13. A vector comprising the DNA molecule of claim 1.
14. The vector of claim 13 wherein the DNA molecule of claim 1 is derived from a *Pseudomonas* strain.
15. A non-*Pseudomonas* bacterial cell comprising the vector of claim 14.
16. An isolated and purified oligonucleotide of about 7-300 nucleotides which hybridizes to DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na₂HPO₄, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.
17. A method for the purification of atrazine chlorohydrolase in at least about 90% yield consisting of a step of adding ammonium sulfate to an aqueous cell-free extract of an atrazine chlorohydrolase-containing bacterium.

18. The method of claim 17 wherein ammonium sulfate is added in an amount of no greater than about 20% of saturation.

19. A method for the degradation of compounds have the following general formula:



wherein $R^1 = Cl$, $R^2 = NR^4R^5$ (wherein R^4 and R^5 are each independently H or a C_{1-3} alkyl group), and $R^3 = NR^6R^7$ (wherein R^6 and R^7 are each independently H or a C_{1-3} alkyl group), with the proviso that at least one of R^2 or R^3 is an alkylamino group; said method comprising adding atrazine chlorohydrolase to a sample containing said compound.

20. The method of claim 19 wherein the sample is a soil sample.

21. The method of claim 20 wherein the soil sample is contaminated with a nitrogen-containing fertilizer.

22. The method of claim 19 wherein the step of adding atrazine chlorohydrolase comprises adding a recombinant bacterium that expresses atrazine chlorohydrolase.

23. The method of claim 19 wherein the step of adding atrazine chlorohydrolase comprises adding the bacterial cell of claim 15.

24. An isolated and purified protein that converts atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence encoded by a DNA molecule having a compliment that hybridizes to a DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na_2HPO_4 , 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.

25. An isolated and purified protein and biologically active derivatives thereof that convert atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence encoded by a DNA molecule having a compliment that hybridizes to a DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na_2HPO_4 , 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.

26. An isolated and purified protein that converts atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence having greater than about 80% sequence identity to the amino acid sequence depicted at SEQ ID NO:2.

27. An isolated and purified protein and biologically active derivatives thereof that convert atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence having greater than about 80% sequence identity to the amino acid sequence depicted at SEQ ID NO:2.